

Fresenius Medical Care AG is the world's leading provider of dialysis products and medical care for patients with chronic renal failure.



## **ESRD Patients in 2004** A Global Perspective

731 139 1/1 GB (3 PUR 05.05) © Copyright 2005 Fresenius Medical Care Deutschland GmbH



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By the end of the year 2004, the number of patients being treated for end-stage renal disease (ESRD) globally reached almost 1.8 million, and continued to grow at an annual rate of around 6% – a growth that is driven by an aging population, increased incidence of diseases involving renal failure, improved technology and better access to treatment. With almost 1.4 million the majority of these patients were undergoing dialysis treatment. This number was unimaginable just some decades ago: for example, the number of patients undergoing dialysis worldwide was estimated to be around only 8,000 in 1970.

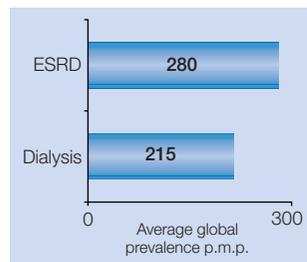
In numerous countries, renal registries and other official bodies are valuable sources of extensive information on various aspects of ESRD demographics, treatment practices and outcomes. Such information provides a base for international comparisons and aids understanding of treatment policies and their implications for the well-being of patients. Conclusions drawn from such data provide knowledge of value to both medical communities and policy makers throughout the world. However, data collection and analysis on such a large scale requires extensive resources, and a time lapse between data collection and publication is unavoidable. Fresenius Medical Care, through its worldwide network, conducts an annual survey that provides an up-to-date overview of ESRD and dialysis patient numbers.

Of the more than 230 countries (or areas of special sovereignty) worldwide, 122 countries are reported to provide dialysis care to patients with renal failure. Thus, approximately 90% of the world population has access to dialysis treatment, at least theoretically. The annual Fresenius Medical Care survey collects and consolidates data from all of these countries, thereby providing a unique insight into the ESRD and dialysis patient populations, their global distributions and the treatment modalities employed.

## Global View of ESRD Patients

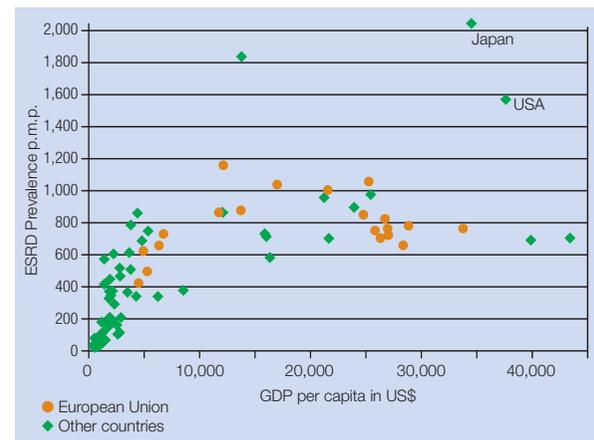
<b>ESRD Patients</b>	<b>1,783,000</b>
thereof HD	1,222,000
thereof PD	149,000
thereof Tx	412,000
<b>World Population</b>	<b>6.4 billion</b>

Annual Growth Rates	
World population	1.2%
ESRD	~6%
HD	~6%
PD	~6%
Tx	6-7%



The global ESRD patient population is estimated to have reached almost 1.8 million at the end of 2004 and, with a 6% growth rate, continues to grow at a significantly higher rate than the world population. Of these around 1.8 million ESRD patients, almost 1.4 million were undergoing dialysis treatment (haemodialysis (HD) or peritoneal dialysis (PD)) and over 410,000 people were living with kidney transplants (Tx). The prevalence of treated ESRD patients in the general population shows a high global variation, ranging from under 100 to over 1,500 patients per million population (p.m.p.). ESRD prevalence is around 2,000 p.m.p. in Japan, exceeds 1,500 p.m.p. in the USA, and averages close to 850 p.m.p. in the European Union. The much lower global average of 280 p.m.p. suggests that, from the global perspective, access to treatment is still limited in many countries and a number of patients with terminal renal failure do not receive treatment.

A comparison of national economic strength (expressed as gross domestic product (GDP)) with prevalence of ESRD suggests that economic factors may impose restrictions on treatment. A restriction is indicated in countries where the GDP per capita is below a limiting value. Further analysis shows that there is no correlation between economic strength and ESRD prevalence in countries with a GDP of over \$10,000 per person per year.

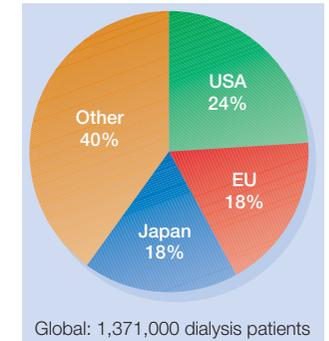


Prevalence of ESRD vs. economic welfare in the 75 countries representing 99% of the global ESRD patient population

## Global View of Dialysis Patients

From a global view, most dialysis patients can be allocated to three major geographical regions: the USA, the European Union (EU) and Japan. 60% of all dialysis patients are treated in these 27 countries.

In fact, over 50% of the global dialysis patient population is treated in just four countries – USA, Japan, Brazil and Germany – although these together account for only around 11% of the world population. The different values for the prevalence of dialysis in the five countries with the largest dialysis patient populations, ranging from as little as 40 in China to 1,940 p.m.p. in Japan, are an indication of the widely varying situation regarding dialysis treatment practices and outcomes. The next 10 countries ranked by the size of their dialysis patient population (i.e. countries 6-15 in the table below) account for 23% of the global dialysis patient population and 9% of the world population. The remaining 23% of global dialysis patients are treated in more than 100 different countries representing more than 50% of the world population (i.e. countries 16-122).



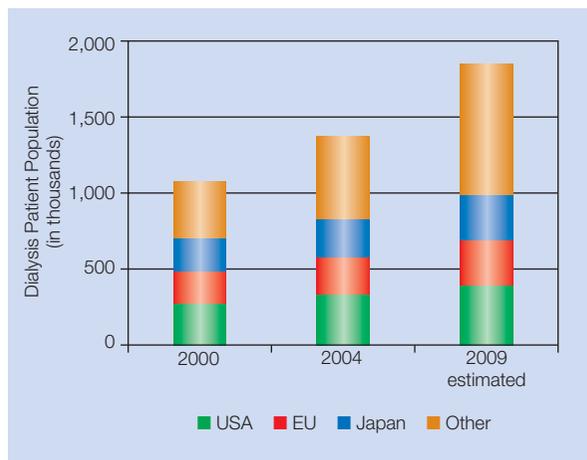
Regional distribution of dialysis patients compared to the general population

Countries ranked by dialysis population	Population (million)	% of world population	Dialysis patients (thousand)	% of total dialysis patients	Prevalence of dialysis (p.m.p.)
USA	294	5%	320	24%	1,090
Japan	128	2%	248	18%	1,940
Brazil	185	3%	68	5%	370
Germany	82	1%	66	5%	800
China	1,300	20%	48	3%	40
Countries 6 to 15	585	9%	311	23%	530
Countries 16 to 122	3,340	52%	310	23%	90
Countries 123 to 232	495	8%	0	0%	0
<b>Total</b>	<b>6,409</b>		<b>1,371</b>		<b>215</b>

Annual Regional Dialysis Population Growth Rates	
USA	3–4%
European Union	3–4%
Japan	3–4%
Other	~10%
<b>Total</b>	<b>~6%</b>

Dialysis patient population growth rates between 2003 and 2004 were similar in the USA, Japan and the European Union. Furthermore, growth rates in these three major geographical regions were significantly lower than those in regions such as Asia, Latin America, the Middle East and Africa. This variation in growth rates may be partially explained by differences in demographics and the maturity of dialysis programmes, i.e. an increasing access to dialysis programs in developing countries.

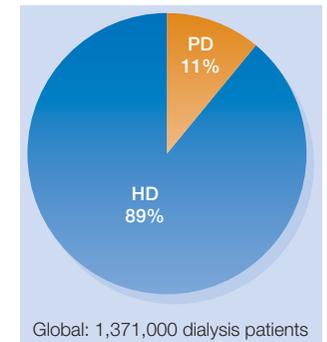
Extrapolation of patient populations based on current growth rates suggests a change in the regional distribution of patients over the next 5 years: a significantly higher proportion of patients may undergo dialysis treatment in Asia, Latin America, Eastern Europe, the Middle East and Africa. This trend becomes particularly clear when present data are compared with corresponding data from the year 2000.



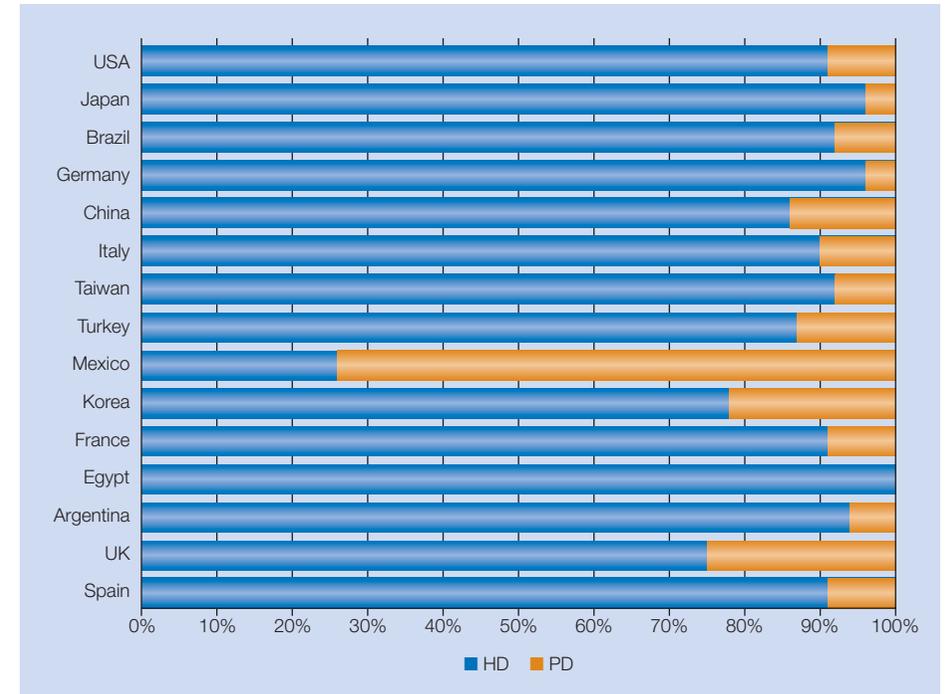
Development of dialysis patient population split by geographical region

At the end of year 2004, haemodialysis remained the most common treatment modality, with approximately 1,222,000 patients undergoing haemodialysis (89% of all dialysis patients) and around 149,000 patients undergoing peritoneal dialysis (11% of all dialysis patients).

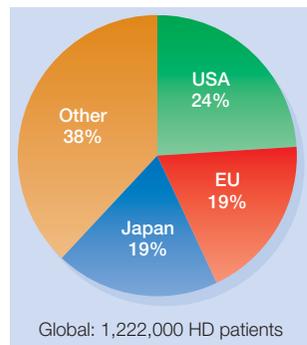
Analysis of the 15 countries with the largest dialysis patient populations indicates that the global HD to PD distribution ratio is not reflected in all countries. Countries such as Mexico, the UK and the Republic of Korea have a significantly higher proportion of PD patients, while Japan, Germany, Egypt and Argentina have clearly less PD patients compared to the global average. With the exception of Mexico, HD is the predominant treatment modality in these 15 countries.



Comparison of HD and PD patient numbers in the 15 largest countries ranked by total dialysis patient population



## Global View of Haemodialysis Patients



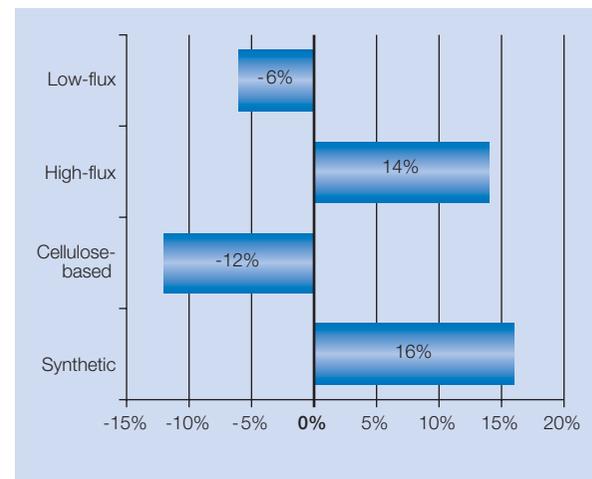
The global distribution and growth rate of haemodialysis patients strongly reflect the global distribution and growth rate of dialysis patients in general.

Most haemodialysis patients undergo treatment in dialysis centres. At the end of year 2004, it was estimated that the great majority of the 1,222,000 HD patients were treated in 22,700 centres worldwide with an average of 54 patients per centre. Further analysis reveals that 46% of dialysis centres lie within the public sector or belong to healthcare organisations, while the remaining 54% are private. However, large geographical variations are evident; for example, more than 98% of centres are private in the USA (private nephrologists and company providers) while only around 41% are so in the European Union.

Annual Regional HD Population Growth Rates	
USA	3–4%
European Union	3–4%
Japan	3–4%
Other	~10%
<b>Total</b>	<b>~6%</b>

Global Patient and Centre Numbers	
HD patients	1,222,000
HD centres	22,700
<b>Average number of patients per centre</b>	<b>54</b>

An analysis of the different dialyser types selected for the treatment of haemodialysis patients in 2004 showed a prevailing trend towards high-flux dialysers and synthetic dialyser membranes. Whereas the low-flux dialyser segment decreased by around 6% in 2004, the high-flux dialyser segment continued to grow by 14%. The total number of cellulose or modified cellulose dialyser membranes decreased by as much as 12%, while the number of synthetic dialyser membranes increased by 16%.

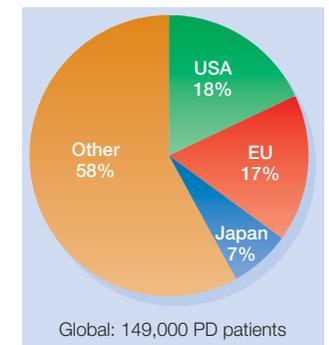


2003–2004 changes in dialyser numbers split by dialyser type

## Global View of Peritoneal Dialysis Patients

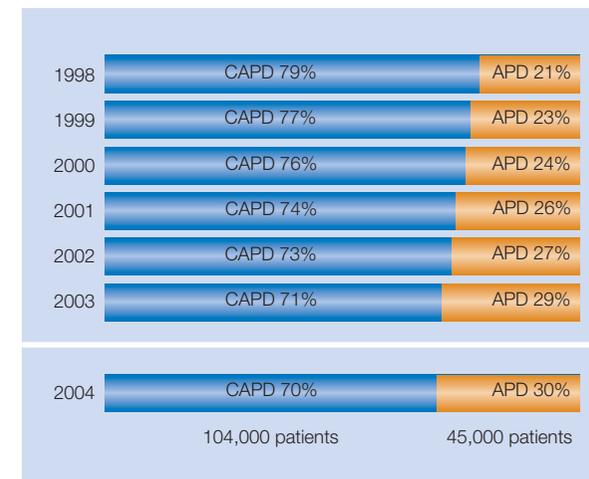
The regional distribution of peritoneal dialysis patients differs from that of both HD patients and dialysis patients in general in that Japan has fewer patients and the “Other” countries have more patients – only around 4% of dialysis patients are treated by peritoneal dialysis in Japan, while this treatment modality is relatively popular in some countries in Latin America and Asia. As already mentioned, large PD patient populations, relative to HD, are to be found in Mexico, the UK and the Republic of Korea.

With an average of 6%, peritoneal dialysis growth rates in 2004 were similar to those of haemodialysis. As in the case of HD, significantly higher growth rates were observed in Asia, Latin America, the Middle East and Africa (region “Other”) than in the three major single geographical regions (USA, EU and Japan). Growth in peritoneal dialysis was again driven by automated peritoneal dialysis (APD). Use of this modality increased by 10–11% in 2004 compared to a 4–5% increase for continuous ambulatory peritoneal dialysis (CAPD). Since 1998, utilisation of APD has increased from 21% of the total PD population to 30% today. Again, strong regional variations in the allocation of patients to either CAPD or APD are evident, with over 50% of patients undergoing APD in some countries.



Annual Regional PD Population Growth Rates	
USA	~0%
European Union	~0%
Japan	~0%
Other	~11%
<b>Total</b>	<b>~6%</b>

Annual PD System Growth Rates	
CAPD	4–5%
APD	10–11%
<b>Total</b>	<b>~6%</b>



Comparison of CAPD and APD patient numbers over the years 1998–2004

The data presented here is derived from information consolidated from 122 countries worldwide.

All data referring to ESRD patients, unless labelled otherwise, refer to the end of year 2004.

Growth rates displayed are the 2003 to 2004 annual growth rates.

All data referring to the European Union (EU) describe the status as from May 1st 2004 (i.e. 25 countries).